

What is Claimed is:

1. A heater comprising:
an insulative substrate;
a resistive film on the substrate having first and second spaced apart portions;
5 first and second connectors in communication with the respective first and second spaced apart portions of the resistive film, and adapted for directing an electrical current from an electrical source through the resistive film; and,
an air moving device for directing an air stream over the resistive film.
- 10 2. A heater according to claim 1 further comprising the insulative substrate including an insulative film formed on a substrate.
3. A heater according to claim 1 further comprising the insulative substrate being at least one hollow tube.
- 15 4. A heater according to claim 1 further comprising the insulative substrate being a plurality of hollow tubes.
5. A heater according to claim 3 further comprising a housing and the at least
20 one hollow tube mounted in the housing.
6. A heater according to claim 4 further comprising a housing and the plurality of hollow tubes mounted in the housing.

7. A heater according to claim 3 further comprising the housing having at least one mounting bracket protruding from an inner surface of the housing and the at least one hollow tube mounted in the at least one mounting bracket.

5 8. A heater according to claim 3 further comprising the housing having a plurality of mounting brackets protruding from an inner surface of the housing and the plurality of hollow tubes mounted in the mounting brackets.

9. A heater according to claim 7 further comprising the at least one mounting
10 bracket in communication with an electrical source and the first and second resistive film connectors.

10. A heater according to claim 8 further comprising the mounting brackets in
communication with an electrical source and the first and second resistive film connectors
15 of the plurality of hollow tubes.

11. A heater according to claim 5 further comprising the at least one hollow tube
having inner and outer heat transfer surfaces, the outer heat transfer surface comprising the
resistive film.

20 12. A heater according to claim 6 further comprising the plurality of hollow
tubes each having inner and outer heat transfer surfaces, each outer heat transfer surface
comprising the resistive film.

13. A heater according to claim 1 further comprising the hollow tube having a longitudinal axis and being disposed in the housing with the longitudinal axis parallel to a direction of airflow through the housing.

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14. A heater according to claim 1 further comprising the hollow tube having a longitudinal axis and being disposed in the housing with the longitudinal axis perpendicular to a direction of airflow through the housing.

10 15. A heater according to claim 1 further comprising the insulative substrate including at least one plate.

16. A heater according to claim 1 further comprising the insulative substrate being a plurality of plates.

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17. A heater according to claim 15 further comprising a housing and the at least one plate mounted in the housing.

18. A heater according to claim 16 further comprising a housing and the plurality
20 of plates mounted in the housing.

19. A heater according to claim 15 further comprising the housing having at least one mounting bracket protruding from an inner surface of the housing and the at least one plate mounted in the at least one mounting bracket.

5 20. A heater according to claim 15 further comprising the housing having a plurality of mounting brackets protruding from an inner surface of the housing and the plurality of plates mounted in the mounting brackets.

21. A heater according to claim 19 further comprising the at least one mounting
10 bracket in communication with an electrical source and the first and second resistive film connectors.

22. A heater according to claim 20 further comprising the mounting brackets in
communication with an electrical source and the first and second resistive film connectors
15 of the plurality of plates.

23. A heater according to claim 15 further comprising the at least one plate
having first and second heat transfer surfaces, the first heat transfer surface comprising a
resistive film.

20 24. A heater according to claim 16 further comprising the plurality of plates each
having first and second heat transfer surfaces, each first heat transfer surface comprising the
resistive film.

25. A heater according to claim 15 further comprising the plate disposed in the housing with the first parallel to a direction of airflow through the housing.

26. A heater according to claim 15 further comprising the plate being disposed
5 in the housing with the first surface perpendicular to a direction of airflow through the housing.

27. A heater according to claim 1 wherein the resistive film comprises a thin
film.

28. A heater according to claim 27 wherein the thin film is formed by a process
selected from the group consisting of chemical vapor deposition and physical vapor
deposition methods.

29. A heater according to claim 1 wherein the resistive film comprises a thick
film.

30. A heater according to claim 29 wherein the thick film is formed by a process
selected from the group consisting of screening and spraying.

31. A heater according to claim 3 wherein the at least one hollow tube includes
at least two concentric tubes, each tube having a resistive film formed thereon.

32. A heater according to claim 3 wherein the at least one hollow tube includes at least one hollow, conical tube.

33. A heater according to claim 32 wherein the at least one hollow tube includes
5 at least one hollow, conical tube disposed within a cylindrical hollow tube, each of the conical and cylindrical tubes having a resistive film formed thereon.

34. A heater according to claim 15 wherein the resistive film comprises a trapezoidal resistive film.